

Name: Key Class: _____ Date: _____

ID: A

Exponents Review Package

Multiple Choice

Identify the choice that best completes the statement or answers the question.

1. Which of the following represents $1 \times 1 \times 1 \times 1$ in exponential form?

- A) 1 (B) 1^4 C) 4 D) 4^1

2. Determine the volume of a cube that has a side length of 13 cm.

- A) 39 cm^2 B) 78 cm^3 C) 169 cm^2 (D) 2197 cm^3

$$13 \times 13 \times 13 =$$

3. In the expression 5^9 , what does the number 5 represent?

- (A) base B) exponent C) multiple D) power

4. Express 2187 as a power of 3.

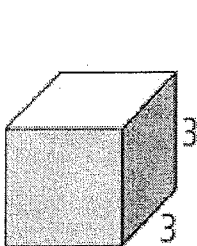
- A) 3×729 (B) 3^7 C) 7^3 D) 729^3

$$\begin{array}{r} 3 \overline{) 2187} \\ \underline{3 729} \\ 3 \overline{) 243} \\ \underline{3 81} \\ 3 \overline{) 81} \\ \underline{3 27} \\ 3 \overline{) 27} \\ \underline{3 9} \\ 3 \overline{) 9} \\ \underline{3 3} \\ 3 \end{array}$$

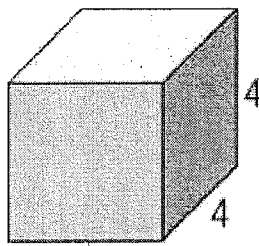
5. Evaluate the power $(-3)^5$.

- (A) 243 (B) 15 C) -15 (D) -243

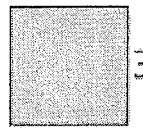
6. Which diagram represents the power 4^3 ?



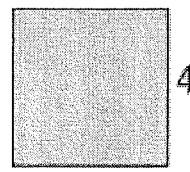
A)



(B)



C)



D)

7. Express $7^2 \times 7^6$ as a single power.

- A) 7^2 B) 7^4 (C) 7^8 D) 7^{12}

8. Evaluate $\frac{7^6}{7^2}$.

- A) 7^2 (B) 7^4 C) 7^6 D) 7^8

9. What is the value of $\left(\frac{3}{8}\right)^0$?

- A) 0 B) $\frac{3}{8}$ (C) 1 D) $\frac{8}{3}$

10. What is $(8 + 4)^2 - (4^3 - 2^5) \div 4$?

- A) 12 B) 28 C) 72 (D) 136

$$\begin{aligned} &= 144 - (64 - 32) \div 4 \\ &= 144 - (32) \div 4 \\ &= 144 - 8 \\ &= 136 \end{aligned}$$

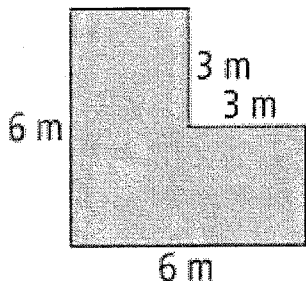
Answers are upside down on last page

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11. An L-shaped flower garden is shown below. Which of the following expressions represents the area of the garden?



- A) $6^2 + 3^2$ B) $6^2 - 3^2$ C) $6^2 \times 3^2$ D) $6^2 \div 3^2$

12. If a colony of 1000 bacteria doubles in size every 2 h, what is the size of the colony after 6 h?

- A) 2000 B) 6000 C) 8000 D) 64 000

3 doubles
 $1000 \times 2 \times 2 \times 2$

Completion

Complete each statement.

13. When multiplying powers with the same base, keep the base the same and add the exponents.
14. To simplify a power of a power, such as $(3^2)^3$, keep the base the same and multiply the exponents.
15. Any base raised to the exponent of zero equals 1.
16. The volume of a cube with side lengths of 12 cm is $12 \times 12 \times 12 = 1728$.
17. $(5^2 + 4^3 - 8^2) =$ $25 + 64 - 64 = 25$
18. $9 \times 9 \times 9 \times 9 \times 9 \times 9 \times 9 \times 9$ expressed as a power is 9^8 .

Matching

Match the correct answer to the expression in each question. An answer may be used more than once or not at all.

- A) 7^6
 B) 4^3
 C) 3^4

- D) 140
 E) 134
 F) 9

B 19. $(2^2)^3 = 2^6 = 64 = 4^3$

C 20. $3^6 \div 3^2 = 3^4$

E 21. $6 + (4^3 \times 2) = 6 + (64 \times 2)$
 $= 6 + 128$
 $= 134$



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F 22. $3^3 \div (3^3 \div 9)$ $27 \div (27 \div 9) = 27 \div (3) = 9$

A 23. $\frac{7^7}{7} = 7^{7-1} = 7^6$

Match the correct term to each of the following descriptions. A term may be used more than once or not at all.

- | | |
|---------------------|------------------------|
| A) base | D) power |
| B) exponent | E) standard form |
| C) exponential form | F) scientific notation |

- B 24. represents the number of times you multiply a number by itself
- C 25. used to represent $2 \times 2 \times 2 \times 2$ as 2^4
- D 26. refers to an expression such as 5^2 or 2^4
- A 27. the number 5 in the expression 5^1
- B 28. the number 2 in the expression 5^2

Short Answer

Write each as a power:

29. Evaluate each expression.

a) 64 as a power of 2 $= 2^6$

b) 243 as a power of 3 $= 3^5$

c) 1296 as a power of 6 $= 6^4$

d) 4096 as a power of 8 $= 8^4$

30. Write each power as repeated multiplication, and evaluate.

- a) 7^4 c) 12^3
b) 11^3 d) 5^5

a) $7 \cdot 7 \cdot 7 \cdot 7 = 2401$

c) $12 \cdot 12 \cdot 12 = 1728$

b) $11 \cdot 11 \cdot 11 = 1331$

d) $5 \cdot 5 \cdot 5 \cdot 5 \cdot 5 = 3125$

31. Determine the area of a square with each side length below.

- a) 7 cm c) 420 mm
b) 13 m d) 2.5 km

a) $7\text{cm} \cdot 7\text{cm} = 49\text{cm}^2$

c) $420\text{mm} \cdot 420\text{mm} = 176400\text{mm}^2$

b) $13\text{m} \cdot 13\text{m} = 169\text{m}^2$

d) $2.5\text{km} \cdot 2.5\text{km} = 6.25\text{km}^2$



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32. Given the side lengths below, calculate the volume of each cube.

a) 8 cm

c) 50 mm

b) 14 m

d) 0.6 km

a) $(8\text{ cm})^3 = 512\text{ cm}^3$

c) $(50\text{ mm})^3 = 125000\text{ mm}^3$

b) $(14\text{ m})^3 = 2744\text{ m}^3$

d) $(0.6\text{ km})^3 = 0.216\text{ km}^3$

33. Evaluate.

a) $10 \times 4 + 6^3$ c) $8^2 \div 4 + 2^2$ b) $5 \times 2^5 - 6^2 \times 2$ d) $2 \times 5^3 \div (35 - 5^2)$

a) $40 + 216 = 256$

c) $64 \div 4 + 4 = 16 + 4 = 20$

b) $5 \times 32 - 36 \times 2 = 160 - 72 = 88$

d) $2 \times 125 \div (35 - 25) = 2 \times 125 \div 10 = 250 \div 10 = 25$

34. Evaluate.

a) $4 \times (9^2 + 3^2 \times 2)$ c) $(7^3 - 3^3) \div 4 - (7^2 + 30)$ b) $5^4 - (8^3 - 2^5 \times 3)$ d) $10 \times (4^3 - 6^2) + 2 \times (8^2 - 4^2)$

a) $4 \times (81 + 9 \times 2) = 4(99) = 396$

c) $(343 - 27) \div 4 - (49 + 30) = (316) \div 4 - 79 = 0$

b) $625 - (512 - 32 \times 3) = 625 - (512 - 96) = 209$

d) $10 \times (64 - 36) + 2(64 - 16) = 10(28) + 2(48) = 376$

35. Evaluate.

a) $\frac{6^3 - 4^3}{2(2^2 \times 19)}$

c) $\left(\frac{4 - 6^3}{5^2 - 3}\right) - 2^3$

b) $(82 - 2) - 2\left(\frac{3^3 - 2^7}{5}\right)$

d) $\left(\frac{9^3 - 36}{8^2 \times 4}\right) + 3\left(\frac{2^5}{4^2}\right)$

a) $\frac{216 - 64}{2(4 \times 19)} = \frac{152}{152} = 1$

c) $\left(\frac{4 - 216}{25 - 3}\right) - 8 = \left(\frac{-212}{22}\right) - 8 = -17.6$

b) $80 - 2\left(\frac{27 - 128}{5}\right) = 80 - 2(-20.2) = 120.4$

d) $\left(\frac{729 - 36}{64 \times 4}\right) + 3\left(\frac{32}{16}\right) = \left(\frac{693}{256}\right) + 3(2) = 2.7 + 6 = 8.7$

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Problem

36. On a test, Laura completes the expression as shown. $4^3 \times 3^5 = 12^8$

a) Did Laura make a mistake? Justify your thinking.

Yes - you can't combine bases like this

b) If Laura did make a mistake, complete the expression correctly.

$$4^3 \times 3^5$$

$$64 \times 243 = 15,552$$

37. Kevin explained to Brad that $4^6 \div 4^2 = 4^3$.

a) Was Kevin's explanation correct or incorrect? Explain your thinking. Incorrect

b) Evaluate $4^6 \div 4^2$.

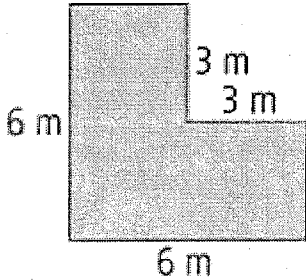
$$= 4^{6-2} = 4^4 = 256$$

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38. A flower garden is shown below. What is the area of the garden?



$$\begin{aligned}
 &6^2 - 3^2 \\
 &= 36\text{m}^2 - 9\text{m}^2 \\
 &= 27\text{m}^2
 \end{aligned}$$

Answers

1. B 2. D 3. A 4. B 5. D 6. B 7. C 8. B 9. C
 10. D 11. B 12. C 13. add 14. multiply 15. 1
 16. 1728cm^3 17. 25 18. 9° 19. B 20. C 21. E
 22. F 23. A 24. B 25. C 26. D 27. A 28. B
 29. a) 2^6 b) 3^5 c) 6^4 d) 8^4 30. a) $7 \cdot 7 \cdot 7 \cdot 7 = 2401$ b) 1331
 c) $12 \times 12 \times 12 = 1728$ d) 3125 31. a) 49cm^2 b) 169m^2
 c) 176400mm^2 d) 6.25km^2 32. a) 512cm^3 b) 2744m^3
 c) 125000mm^3 d) 0.016km^2 33. a) 256 b) 88 c) 80
 d) 25 34. a) 396 b) 2009 c) 0 d) 376 35. a) 1
 d) 25 36. a) Yes b) $64 \times 243 = 15552$
 37. a) incorrect b) $4^4 = 256$ 38. 27m^2